A RESEALABLE BAG FOR FILLING WITH FOOD PRODUCT(S) AND METHOD

This is a continuation patent application of PCT Application No. PCT/US00/25393 filed on 15 September 2000 which is a continuation-in-part patent application of U.S. Continuation-in-part Patent Application Serial No. 09/474,493 filed on 29 December 1999 which is a continuation-in-part of U.S. Patent Application Serial No. 09/431,732 filed on 1 November 1999. These applications are now pending and not abandoned, and are commonly owned by the assignee hereof.

Background of the Invention

The present invention relates generally to the field of reclosable bags and more specifically to reclosable bags that use or incorporate tamper evident, hermetic seal, and reclosable fastener assemblies or mechanisms of the slider, zipper, or press-to-close type. The present invention is particularly concerned with a reclosable bag that may be filled with a food product at a factory or food processing plant and then sealed to protect the food product until such time as a customer purchases the reclosable bag and opens it to access the food product within.

Reclosable, typically flexible, containers are well known in the art. Such containers normally comprise a

bag-like structure made from a folded web of material, like thermoplastic film. These types of containers may also include reclosable zipper structures, as well as interlocking male and female zipper elements fused, extruded, or attached to the bag sidewalls. Alternatively, the reclosable zipper structures, mechanisms, or assemblies may also be identified as slider closure systems, i.e., a closure system for slider bags and form, fill and seal technology that contain two tracks that can be interlocked and a separate part (a slider) that rides on the tracks and is used to open and/or close the tracks. The bag-like structure is created when the thermoplastic film is folded, sealed, and severed along its exposed edges.

Reclosable bags are a great convenience to the consumer. This is especially true where the food product or material contained within the bag is of a type that may not all be consumed at once, for example, shredded cheese, sliced cheese, cheese, processed cheese, deli meats, snack foods, vegetables, fruits, sweets, etc. A problem with these types of bags is achieving a design in which the food product is hermetically sealed against oxygen, atmospheric intrusion or transmission, bacteria, molds, and/or other sources of contamination, while also providing features that help to disclose to the consumer evidence of tampering without substantially interfering with the ease of use of the bag.

In addressing this problem it is also desired to achieve a design that is easy to manufacture and may be used in combination with known types of packaging machinery that use form, fill, and seal technology such as Horizontal Form Fill and Seal (HFFS) machines or Vertical Form Fill and Seal (VFFS) machines. It is also desired to achieve a design that may optionally be used in combination with Horizontal Flow Wrapper (HFW)

machines; e.g., J-WRAP machines presently available from Jones Automation Company, Inc. of Beloit, Wisconsin.

Tamper evident packaging may also require the use of several pieces of film, which must then be connected to each other. This can make manufacturing of the reclosable bag more complicated.

Gusseted style packages are additionally greatly convenient to the consumer. Gusseted style packages allow the package to stand upright due to their wider base. This is true when it is desirable to stand a package upright by itself. Further, the wider base of the gusseted style package enables them to hold a greater volume of product than a conventional four-sided seal package of similar dimensions. The challenge has been to combine the convenience of a zippered packaged in one gusseted, reclosable bag.

With a "press to close" type zipper, the gusset style package is typically formed with the gusset at the bottom and the zipper at the top. This type of package is filled through the opened zipper. Several problems have arisen during production and filling of this type package. For example, in the package making process, it is necessary for the "press to close" zipper to be closed (i.e. the male and female profiles need to be engaged), when the zipper profiles are fused together at the side seal. If the male and female profiles are not engaged, they are subject to misalignment. If they are misaligned at the side seal station, the resulting package will have a zipper that does not close completely, specifically adjacent to the side seal, and a leaky package results. Furthermore, after the side seal is added, the usually simple process of opening the zipper for filling using a stationary blade to plow the zipper open, is no longer a reasonable option. Rather, the zipper must be opened, by either pulling the sides of the

package that the zipper is attached to apart, or by holding the sides securely while a plunger lowers into the upper portion of the package, forcing the zipper open. Regardless of the method chosen, an unacceptable percentage of unopened packages or damaged zippers results.

An additional problem encountered by usual top filling of the zippered, gusseted bag, is product waste and contamination of zipper profiles. As a solution to this problem, some filling processes lower a fill tube into the package and past the zipper profiles area in an attempt to protect the profiles from the product. This technique reduces profile contamination, but does not eliminate it. This is because clearance must be maintained between the fill tube and the package walls to ensure consistency of tube insertion and to provide an exit passage for the air of the package that the product is displacing. In the stream of air exiting the package to make room for the product, some product is inevitably included, and profile contamination results.

A further problem associated with traditional top filling of zippered, gusseted packages occurs when the zipper is closed after the package has been filled with product. The usual method forces the zipper closed by applying force to both sides of the zipper and in a direction tangent to the sides of the package. This process may not consistently close the zipper and those that do close may have product pushed into the zipper profiles.

Gusseted packages using a slider type zipper encounter additional filling problems. In filling a package of this type, the slider portion of the zipper must be slid from one side of the package to the other in order to open the profiles. Once the package is filled, the sliding of the slider portion must be reversed to

close the top. This process is difficult and expensive, rendering top filling through slider type zippered packages to be commercially impractical.

The closest gusseted package references are believed to be U.S. Patent No. 5,938,337 issued on 17 August 1999, U.S. Patent No. 5,529,394 issued on 25 June 1996, and U.S. Patent No. 5,417,040 issued on 23 May 1995. Although these patents disclose advantageous methods, they fail to fully utilize the benefits of a gusseted type package. Namely, because of the wider base provided in a gusseted bag, they are able to hold a greater volume than conventional four sided seal packages of the same height and width. The above-mentioned patents provide methods for filling the gusseted bag from the gusset side of the package and opposite the closure mechanism. However, when a gusseted bag is filled from the bottom, gusseted side, product stacks upward in the package similarly to filling a conventional four sided package. The result is the inability to fully utilize the added volume benefit that the gusset provides.

It is one of the objectives of the present invention to provide a reclosable bag that may be manufactured using known packaging machinery. As previously, noted, such known machinery includes HFFS machines, VFFS machines, and HFW machines. Additionally, as will be apparent to a person of skill in the art after reading the present disclosure contained herein thermoform type machines like the one disclosed in US Patent No. 4,240,241 could also be used to practice the present invention disclosed herein, after appropriate modification as the disclosure herein will make apparent.

It is also an objective to perform the manufacturing task using only one piece of parent film in combination with a reclosable zipper assembly.

Further, it is an objective of the invention to

provide the manufacturer with the option of including some or all the features of tamper resistance or evidence, hermetic seal, and ease of use in the reclosable bag that is produced.

Another objective, especially with slider or zipper type structures or sliding type zippers or fasteners is ease of use. While a sliding type zipper structure is itself relatively easy to use, the bag structures include sidewalls or fin portions that extend up past the sliding type zipper structure. This interferes with the consumer's access to the food, makes it difficult to see the zipper structure, and also makes it more difficult to easily operate the zipper mechanism. This is especially true if the person opening and closing the bag is disabled, has arthritis, or another aliment, which limits the manual dexterity of that person.

Additionally, increased ease of access to the food product is an objective because the larger the zipper structure and its associated elements the smaller the opening left to the consumer to access the food product.

It is a further objective to provide a reclosable gusseted package that may be side filled with product.

It is another objective to provide a reclosable gusseted package that may be side filled and avoid zipper profile contamination.

It is another objective to provide a reclosable, gusseted package that may be side filled to ensure optimal volumetric filling of the gusseted portion.

It is one of the objectives of the present invention to provide a gusseted reclosable bag that may be manufactured using known packaging machinery, such known machinery includes HFFS machines.

The present invention is believed to address these and other objectives by the unique and simple structures and methods disclosed herein.

Summary of the Invention

The present invention may generally be described as a reclosable bag for filling with at least one food product. The reclosable bag includes at least one sheet of web material. The sheet of web material has at least two areas of structural weakness and at least one fold structure located between and defined by the two areas of structural weakness. The reclosable bag includes an opening located generally opposite the fold structure. (Please note that fold structure as used in the specification and claims herein is to be interpreted as broadly as possible and should include not only structures that are a fold but also any structure that has the same or similar characteristics to a fold even though said structure may be formed by non-folding means or methods such as the result of joining or fusing the edges of two or more sheets of film.) In addition, the reclosable bag includes a sliding fastener structure having a skirt structure of web material extending therefrom and located within the fold structure. The skirt structure or skirt material may be either integral to the slider fastener structure or it may be coupled, e.g., sealed or adhered, to the slider fastener structure. The skirt structure includes a distal margin that is coupled to the sheet of web material at a location between the areas of structural weakness and the opening. The web material of the reclosable fastener structure extending past the areas of structural weakness so that the reclosable fastener structure is located within the fold structure. The reclosable bag is capable of being filled with at least one food product through the opening.

The reclosable bag structure of the present invention may optionally include other features. For example, but not by way of limitation, the skirt may

include an outside surface and an inside surface. The distal margin is located on the outside surface. The inside surface may include a predetermined area having a releasable adhesive material. This allows for the option of having a peelable seal, which may be used to aid in making the reclosable bag initially hermetic and may also add another reclosable/resealable feature to the bag. (Please note that the terms reclosable, resealable, and releasable, in addition to their normal meaning, are used herein, interchangeably, to describe a closed or sealed opening that may be re-opened at a predetermined time to aid in providing access to at least a portion of the contents of the bag, and then closed or sealed to allow the remaining contents to be stored in the bag for later use and/or provide evidence of tampering.)

Additionally, and more typically, the web material of the reclosable bag is substantially comprised of a predetermined portion of a roll of a parent film material. The predetermined portion having predetermined dimensions from which a reclosable bag of predetermined dimensions may be constructed. The parent film material may be manufactured to a specification which determines the shape and location of the areas of structural weakness and which makes the areas of structural weakness an integral part of the parent film. Presently, it is believed to be commercially preferred to do so. Alternatively, the areas of structural weakness could be applied to the parent film at a predetermined step of the construction or manufacturing process of the resealable bag.

Further, the areas of structural weakness may extend intermittently, continuously, and linearly, non-linearly, or in some other predetermined pattern across a predetermined dimension of the sheet of web material. The predetermined dimension where the area of structural

weakness is located may be either the length or the width of the reclosable bag, which is usually rectangular in shape, depending on whether or not it is desired to use the long edge or side of the bag or the short edge or side of the bag with the slider closure system. Use of the long edge of the bag provides for a larger opening and thus enhances the ease of access to the food material or other materials contained within the reclosable bag.

The term structural weakness is generally used to describe that area of the reclosable bag that is intentionally designed to be easily torn by the consumer to provide for evidence of tampering and to allow for easy exposure of the zipper mechanism or assembly. Nonetheless, it should be understood that use of the term structural weakness should include, without limiting its meaning, structures such as perforation, scores, microperforations, and multiple laminate materials which include a layer having an area of material or materials which are specifically designed to be easily torn. Accordingly, it should be understood that the areas of structural weakness are intentionally designed to create a predetermined tear path, which may or may not be hermetic.

Also, opening of the bag may be facilitated by the application of a tear strip (e.g., tear tape or tear string) along a predetermined surface or surfaces of the parent film. The tear strip may or may not be used in combination with a predetermined area of structural weakness.

Alternatively, the present invention may be described as a reclosable bag for filling with at least one food product and comprising at least one sheet of a web material. The sheet of web material includes a first area of structural weakness and a second area of structural weakness. (Alternatively, the areas of

structural weakness may be tear areas or areas having a propensity to tear in a predetermined direction.) The sheet of web material including at least one fold structure, located between and defined by the first and second areas of structural weakness, and a fill opening. The sheet of web material further comprising a first panel coupled to the fold structure at the first area of structural weakness and a second panel coupled to the fold structure at the second area of structural weakness. A reclosable fastener structure including a male track structure and a female track structure. The male track structure including a first fin structure of web material extending therefrom and the female track structure including a second fin structure of web material extending therefrom. Each fin structure including a predetermined coupling portion. The coupling portion of the first fin structure being coupled to the first panel and the coupling portion of the second fin structure being coupled to the second panel. (please note that the seal, when it is formed, may be adjacent or near but should not be on the area of structural weakness). The reclosable fastener structure extending past the areas of structural weakness and into the fold structure. The areas of structural weakness being located below the reclosable fastener structure. The alternative reclosable bags are also capable of being filled with at least one food product through the fill opening, which is subsequently sealed.

The present invention allows the fold structure to be easily removed from the reclosable bag. More importantly the present invention allows the consumer to substantially expose the reclosable fastener structure so that it is easily accessible and the consumer does not have to be impeded by bag sidewalls or bag fin portions that extend up past the zipper structure. Finally, the

present invention accomplishes this using but not limited to substantially one piece of film material.

Alternatively, the present invention may be described as a reclosable bag for filling with at least one food product. The reclosable bag may include at least one sheet of web material, at least one tear tape structure, at least one fold structure, and an opening located generally opposite the fold structure. A reclosable fastener structure including at least one integral skirt structure of skirt web material extending therefrom. The integral skirt structure including at least one distal margin. The distal margin being coupled to the web material at, at least one location between the tear tape structure and the opening. The reclosable fastener structure extending past the tear tape structure and into the fold structure. The reclosable bag capable of being filled with at least one food product.

Additionally, the reclosable bag for filling with at least one food product, may also be described as a reclosable bag including at least one sheet of web material having at least one fold structure presenting at least two sidewall structures having inside surfaces, and an opening located generally opposite the fold structure. A reclosable fastener structure including an integral skirt structure comprising a web material extending therefrom and including opposed distal margin structures. The web material of the integral skirt structure being sealed to the inside surfaces of the sidewall structures at a plurality of predetermined sealing areas. The reclosable bag may also include a barrier web material extending between and coupled to the distal margin structures.

The barrier web material of the alternative bag may alternatively extend between and be coupled to the sidewall structures. Alternatively, the barrier web

material may also be coupled to predetermined sealing areas by at least one peelable seal. Alternatively, the barrier web material may include at least one area of structural weakness that extends through it along a direction generally parallel to the predetermined sealing areas.

Alternatively, the reclosable bag for filling with at least one food product of the present invention may include at least one sheet of web material having at least one predetermined tear area, at least one fold structure, and an opening located generally opposite the fold structure. A reclosable fastener structure including at least one integral skirt structure of skirt web material extending therefrom. The integral skirt structure including at least one distal margin. The distal margin being coupled to the web material at, at least one location between the tear area and the opening. The reclosable fastener structure extending past the tear area and into the fold structure. The reclosable bag capable of being filled with at least one food product.

This alternative reclosable bag structure may further include at least one piece of a header material located in a predetermined area of the fold structure. The header material may include at least one edge structure adjacent the tear area. The reclosable bag of this alternative structure may further include at least one tear tape structure coupled to the web material and adjacent to the tear area.

Alternatively, the present invention may be described as a reclosable bag for filling with at least one food product. The reclosable bag may include at least one sheet of web material, at least one tear tape structure, at least one fold structure, and an opening. A reclosable fastener structure including at least one

integral skirt structure of skirt web material extending therefrom. The integral skirt structure including at least one distal margin. The distal margin being coupled to the web material at, at least one location between the tear tape structure and the opening. The reclosable fastener structure extending past the tear tape structure and around and over the fold structure. The reclosable bag capable of being filled with at least one food product.

Additionally, the reclosable bag for filling with at least one food product, may also be described as a reclosable bag including at least one sheet of web material having at least one fold structure, and an opening. A reclosable fastener structure including an integral skirt structure comprising a web material extending therefrom and including opposed distal margin structures. The web material of the integral skirt structure being sealed to the outside surfaces of the sidewall structures at a plurality of predetermined sealing areas. The inside surface of the reclosable bag may also include a predetermined area having a releasable adhesive material. This allows for the option of having a peelable seal, which may be used to aid in making the bag initially hermetic and may also add another reclosable/resealable feature to the bag.

Additionally, the present invention may be described as a method of construction using known form-fill-and-seal machinery including but not limited to HFFS, VFFS, and HFW machines. The steps of the method of construction include 1. Folding the sheet of web material along a predetermined folding area located between the areas of structural weakness to form the fold structure. 2. Inserting the reclosable fastener into the fold structure. 3. Coupling the distal margin of the integral skirt structure to the web material. 4.

Sealing the web material along at least two predetermined linear areas located generally perpendicular to the fold structure. 5. Filling the reclosable bag with at least one food product through an opening. 6. Sealing the opening. Please note that in an HFW application it is presently believed that the step four should occur last.

The method may also include a step of inserting either a tear tape or a tear string at least prior to step four. Further, a header strip could also be introduced prior to step four.

Alternatively, the web material may be slit along the fold line and the reclosable fastener assembly inserted and sealed to result in an exposed zipper structure assembly at one end of the bag.

Also, alternatively, if the reclosable bag is designed to have a gusset opposite the zipper opening then the fill opening may be sealed and the bag may be filled with product through the zipper opening.

Alternatively, the present invention may generally be described as a gusseted, reclosable bag for filling with at least one food product. The gusseted, reclosable bag includes at least one sheet of web material. The sheet of web material has at least two areas of structural weakness, a gusseted portion, at least one fold structure and an opening located generally between the fold structure and the gusseted portion.

In addition, the reclosable bag includes a sliding fastener structure having a skirt structure of web material extending therefrom. The skirt structure or skirt material may be either integral to the slider fastener structure or it may be coupled, e.g., sealed or adhered, to the slider fastener structure. The skirt structure includes a distal margin that is coupled to the sheet of web material at a location between the fold and the opening. The reclosable bag is capable of being

filled with at least one food product through a fill opening located between the skirt structure and the gusseted portion.

A backing or barrier strip structure is inserted between and extending below the zipper skirts along the side fill opening. The backing or barrier strip structure may be made out of any suitable material but is preferably two-ply and composed of a laminate film such as Curwood's 7182 barrier film. One side of the barrier strip structure to be used in the present invention is nylon, or any other suitable material such as polypropylene, which will not bond to the parent film. The opposite side of the barrier strip structure may be provided with a sealant such as polyethylene, polyethylene blend, or a polyethylene co-extrusion. The sealant side is sealed or tacked to the inside surface of the top (or front side) zipper skirt prior to insertion into an upper fold (i.e. fold structure). Once inserted into the upper fold, the front side of each zipper skirt is sealed to the parent film. The parent film then passes over folding boards to form a bottom gusset. The remaining unsealed edge of parent film extends upward to meet the other edge located at zipper skirt. After filling with product, the final sealing bar seals the parent film to the zipper skirt and a portion of the barrier strip structure to make a hermetic package. With the barrier strip structure inserted between and extending below the zipper skirts, the zipper skirts will not seal to each other and the nylon side of the barrier strip structure will not seal to the opposite inside surface of the parent film.

The gusseted, reclosable bag structure of the present invention may optionally include other features. For example, but not by way of limitation, the skirt may include an outside surface and an inside surface. The

distal margin is located on the outside surface. The inside surface may include a predetermined area having a releasable adhesive material. This allows for the option of having a peelable seal, which may be used to aid in making the reclosable bag initially hermetic and may also add another reclosable/resealable feature to the bag.

Alternatively, if the reclosable bag is designed to have a gusset opposite the zipper opening, the bag may be filled with product through a fill opening located between the zipper skirt and the gusseted portion.

Alternatively, the present invention may be described as a gusseted, reclosable bag for side filling with at least one food product and comprising at least one sheet of a web material. The sheet of web material includes a first area of structural weakness and a second area of structural weakness. (Alternatively, the areas of structural weakness may be tear areas or areas having a propensity to tear in a predetermined direction.) The sheet of web material including at least one fold structure, located between and defined by the first and second areas of structural weakness, a fill opening, a backing or barrier strip structure, and a gusseted portion. A reclosable fastener structure including a male track structure and a female track structure. The male track structure including a first fin or skirt structure of web material extending therefrom and the female track structure including a second fin or skirt structure of web material extending therefrom. Each fin structure including a predetermined coupling portion. (Please note that the seal, when it is formed, may be adjacent or near but should not be on the area of structural weakness). The reclosable fastener structure extending past the areas of structural weakness and into the fold structure. The areas of structural weakness being located below the reclosable fastener structure.

The backing or barrier strip structure is inserted between and extending below the fin or skirt structures along the side fill opening. As in the previous embodiment, one side of the barrier strip structure to be used is nylon, or any other suitable material such as polypropylene, which will not bond to the parent film. The opposite side of the barrier strip structure may be provided with a sealant such as polyethylene, polyethylene blend, or a polyethylene co-extrusion. The sealant side of the backing or barrier strip of this alternative embodiment may be sealed or tacked to the inside surface of the top (or front side) zipper skirt prior to insertion into an upper fold (i.e. fold structure). Once inserted into the upper fold, the front side of each zipper skirt is sealed to the parent film, as discussed with regard to the reclosable gusseted bag with sliding fastener structure. Alternatively, an anti-seal agent may be brush applied to the inside surface of the zipper skirt prior to insertion into an upper fold.

Alternatively, the present invention may be described as a gusseted, reclosable bag for side filling with at least one food product. The reclosable bag may include at least one sheet of web material, at least one fold structure, at least one gusset structure, a side fill opening having a backing or barrier strip structure, located generally between the fold structure and the gusset structure. A reclosable fastener structure including at least one integral skirt structure of skirt web material extending therefrom. The integral skirt structure including at least one distal margin. The distal margin being coupled to the web material at, at least one location between the fold structure and the opening. The reclosable bag capable of being filled with at least one food product.

This alternative reclosable bag structure may

further include at least one piece of a header material located in a predetermined area of the fold structure. The header material may include at least one edge structure adjacent the tear area.

Additionally, the present invention may be described as a method of construction using known form-fill-and-seal machinery including but not limited to HFFS, VFFS, and HFW machines. The steps of the method of construction include 1. Placing a backing or barrier strip structure in registration with the side seal. 2. Punching out the strip in the area that is both in the side seal and adjacent to the skirt of the zipper to which the backing or barrier strip will be attached. 3. Attaching the backing or barrier strip to the inside face of one of the skirts of a zipper track with sealant side of the strip facing the inside surface of the skirt. 4. Heat sealing a portion of the remaining strip adjacent the zipper skirt to the zipper skirt. 5. Folding the sheet of web material along a predetermined folding area located between areas of structural weakness to form a fold structure. 6. Inserting the reclosable fastener and attached backing strip structure into the fold structure. 7. Attaching the zipper track to the web in a location relative to the areas of structural weakness by heat sealing the web to the skirt portions of the zipper track. 8. Positioning the edge of the web such that it is attached to, but not covering the entire portion of, the skirt having the barrier strip attached. 9. Passing the remaining web across folding boards such that a gusset is formed at the bottom of the package. 10. Folding the other edge of web material upward to the remaining exposed zipper skirt having the backing or barrier strip attached, and adjacent to the first edge of the web. 11. Sealing the web material along at least two predetermined linear areas located generally

perpendicular to the fold structure. 12. Filling the reclosable bag with at least one food product through the side opening. 13. Sealing the opening.

The method may also include a step of introducing a header strip prior to step ten.

Alternatively, the process and structure of the present invention could include a reclosable fastener assembly having two skirts or flaps of web material. The first skirt could be coupled or sealed to the parent film prior to folding the parent film. (Additionally, the first skirt could be tack or partially sealed prior to folding and then subsequently a full seal applied in the HFFS, VFFS, or HFW machine.) After folding the parent film the second skirt or flap would be sealed to the film sidewall located opposite the sidewall to which the first skirt is sealed or coupled. Construction of the bag could then be completed as disclosed herein.

Description of the Drawings

Figure 1 is a top plan view of a predetermined portion of parent film comprising a sheet of web material including at least two areas of structural weakness.

Figure 2 is an edge elevational view of a portion of the sheet of web material of Figure 1 and shows the location of the areas of structural weakness.

Figure 3 is a side elevational view of the fold structure of a reclosable bag of the present invention showing the position of the slider or zipper structure in the fold structure relative to the predetermined position of the areas of structural weakness.

Figure 4 is a perspective view of the embodiment shown in Figure 3.

Figure 5 is a front plan view of a first embodiment of the present invention.

Figure 6 is a front plan view of an alternative to the first embodiment of the present invention disclosing

sealed track mass 23b.

Figure 7 is a front plan view of an alternative embodiment of the present invention.

Figure 8 is a view taken from line 8--8 of Figures 5 and 6.

Figure 9 is an alternative to the embodiment of the present invention shown in Figure 8.

Figure 10 is another alternative to the embodiment shown in Figure 8.

Figure 11 is an alternative to the embodiment shown in Figure 10 wherein a peal seal tape with a releasable adhesive located on one side of the tape is used.

Figure 12 is a view from line 12—12 of Figure 11, the header material 15 that is shown, along with other structures, is optional.

Figure 13 is another alternative to the embodiment shown in Figure 8.

Figure 14 is a front plan view of another alternative embodiment of the present invention.

Figure 15 is a view taken from line 15--15 of Figure 14.

Figure 16 is an alternative to the embodiment of the present invention shown in Figure 15.

Figure 17 is another alternative to the embodiment shown in Figure 15.

Figure 18 is another alternative to the embodiment shown in Figure 15.

Figure 19 is a front plan view of an alternative embodiment of the present invention.

Figure 20 is a view from line 20--20 of Figure 19.

Figure 21 is a plan view of an alternative embodiment of the present invention illustrating various features of the invention including die cutting of the track mass of the zipper assembly and the use of a tear structure like a tear tape or a tear string.

Figure 22 is a view from line 22--22 of Figure 21.

Figure 23 is a view of an alternative to the embodiment shown in Figure 22 wherein tear tape is applied to both the inside and outside surface of the bag.

Figure 24 is a cut-away view of an alternative to the embodiment shown in Figure 22 wherein the tear tape includes a tear bead.

Figure 25 is a perspective view of the embodiment shown in Figure 24.

Figure 26 is a cut-away view of a predetermined portion of the embodiment shown in Figure 24 illustrating the tear tape and tear bead's relationship to the film and the area of structural weakness created as a result of the presence of the tear bead.

Figure 27 is an alternative embodiment to the structure disclosed in Figure 22.

Figure 28 is a plan view of an alternative embodiment of the present invention illustrating various features of the invention including the use of an optional header strip and the use of an optional opening to assist in removal of the hood and exposure of the zipper assembly.

Figure 29 is a view from line 29--29 of Figure 28.

Figure 30 is a schematic diagram showing the components of another alternative embodiment of the present invention being fed into a machine suitable for adaptation to perform the process and make at least one of the products disclosed herein before the plow structure of the machine.

Figure 31 is a schematic diagram showing the components of another alternative embodiment of the present invention being fed into a machine suitable for adaptation to perform the process and make at least one of the products disclosed herein before the plow

structure of the machine.

Figure 32 is a schematic top plan view illustrating at least one method by which the components of the alternative embodiment disclosed in Figure 30 are introduced prior to the plow mechanism of the form fill and seal machine.

Figure 33 is a schematic top plan view illustrating at least one method by which the components of the alternative embodiment disclosed in Figure 31 are introduced prior to the plow mechanism of the form fill and seal machine.

Figure 34 is a perspective view generally showing the general relationship of the components for making the various embodiments disclosed herein. Specifically, the embodiment having the peel seal tape is disclosed although after review of this disclosure it will be apparent to a person of ordinary skill in the art how the machinery may be modified to produce the various embodiments disclosed, described, and claimed herein.

Figure 35 is side elevational schematic view illustrating the steps of construction of the alternative embodiment disclosed in Figure 30 subsequent to folding the parent film on the plow structure.

Figure 36 is side elevational schematic view illustrating the steps of construction of the alternative embodiment disclosed in Figure 31 subsequent to folding the parent film on the plow structure.

Figure 37 is an alternative embodiment of the present invention illustrating various features of the invention including the use of tear string and a diamond shaped opening as opposed to a circular opening for assisting in the removal of the hood and exposing the zipper assembly.

Figure 38 is a schematic diagram showing the components of another alternative embodiment of the

present invention being fed into a machine suitable for adaptation to perform the process and make the product disclosed herein, wherein either a tear string or the zipper assembly are introduced to the parent film after the plow.

Figure 39 is a side elevational schematic view illustrating the steps of construction of the alternative embodiment disclosed in Figure 38 wherein the tear string or slider or zipper assembly is introduced after the plow structure.

Figure 40 is a front plan view of an alternative embodiment of the present invention.

Figure 40a is a front plan view of the alternative embodiment of Figure 40, but showing a peel seal area.

Figure 41 is a view taken from line 41 - 41 of Figure 40a and showing the reclosable fastener structure extending over the fold structure and peel seal.

Figure 41a is an enlarged view of the structure shown in Figure 41 and showing the position of the slider or zipper structure over the fold structure relative to the predetermined position of the areas of structural weakness.

Figure 42 is a front plan view of an alternative embodiment of the present invention.

Figure 43 is a view taken from line 43-43 of Figure 42 and showing a gusset portion, a slider fastener, and barrier strip and fill opening therebetween.

Figure 44 is a view similar to that shown in Figure 43 but with the gusset portion open and showing a flattened bottom.

Figure 45 is a side elevational view of the fold structure of the reclosable bag shown in Figures 42 - 44 showing the position of the slider or zipper structure in the fold structure relative to the barrier strip and fill opening, and showing side 36 in phantom in position for

filling through side opening, and side 36 in solid line illustrating the closed opening after filling.

Figure 45a is a partially cut-away perspective view of the alternative embodiment shown in Figure 45.

Figure 46 is a schematic diagram illustrating at least one method by which the components of the alternative embodiment disclosed in Figures 42 - 45 are assembled.

Figure 47 is a schematic top plan view illustrating at least one method by which the components of the alternative embodiment disclosed in Figures 42-45 are introduced prior to the plow mechanism of the form fill and seal machine.

Figure 48 is a side elevational schematic view illustrating the steps of construction of the alternative embodiment disclosed in Figure 42-45 subsequent to folding the parent film on the plow structure and tucking board.

Figure 49 is a front plan view of an alternative embodiment of the present invention.

Figure 50 is a view taken from line 50-50 of Figure 49 and showing a gusset portion, press-to-close fastener with barrier strip, and fill opening between the gusset portion and fastener.

Figure 51 is a view similar to that shown in Figure 50 but with the gusset portion open and showing a flattened bottom.

Figure 52 is a side elevational view of the fold structure of the reclosable bag shown in Figures 49 - 51 showing the position of the press-to-close zipper structure in the fold structure relative to the barrier strip and fill opening, and showing side 36 in phantom while in position for filling through the fill opening and side 36 in solid line illustrating the closed and sealed, post-fill position.

Figure 53 is a schematic diagram illustrating at least one method by which the components of the embodiment disclosed in Figures 49-52 are assembled.

Figure 54 is a schematic top plan view illustrating at least one method by which the components of the embodiment disclosed in Figures 49-52 are introduced prior to the plow mechanism of the form fill and seal machine.

Figure 54a is a cross sectional view taken along lines 54a-54a of Figure 54 and showing the press-to-close zipper structure and backing strip.

Figure 55 is a side elevational schematic view illustrating the steps of construction of the alternative embodiment disclosed in Figures 49-52 subsequent to folding the parent film on the plow structure and tucking board.

Figure 55a is an enlarged partial view of the area referred generally as 55a in Figure 55.

Figure 56 is a perspective view generally showing the general relationship of the components for making the gusseted embodiments shown in Figures 42-55a.

Figure 57 is a perspective view generally showing the relationship of the components for making a prior art gusseted bag.

Figure 58 is a perspective view of a prior art, top filled gusseted bag.

Figure 59 is a perspective view of a side fill gusseted bag of the present invention and showing a slider type zipper and a backing strip.

Detailed Description

Although the disclosure hereof is detailed and exact to enable those skilled in the art to practice the invention, the physical embodiments herein disclosed merely exemplify the invention which may be embodied in other specific structures or methods. While the

preferred embodiment has been described, the details may be changed without departing from the invention, which is defined by the claims.

The present invention is both a method and a structure resulting from the method. The present invention generally relates to reclosable plastic bags 100 and, more particularly, to a reclosable plastic bags 100 having a slider or zipper assembly 20, which cooperates with a tamper-evident feature. The tamper-evident feature may also be a hermetic seal feature. The method of the present invention, while unique and fully described herein, may be used on known machinery such as, by way of illustration and not by way of limitation, the rpm 100 packaging machine manufactured by Klockner Packaging Machinery of Sarasota, Florida, U.S.A. The modifications necessary to the machinery used to practice the present invention will be apparent to a person of ordinary skill in the art after reading this disclosure.

Reclosable plastic bags using various zippers and sealing mechanisms are well known. However, the advantages of the present invention are believed not to be apparent from the known zippers and sealing mechanism of the prior art. The zipper assembly 20 typically includes a zipper structure 20a and an integral skirt 16. In the present invention, the skirt 16 is bonded to the parent film 10 at a predetermined seal location 14. See Figure 3.

Referring to Figures 1-5, the method and structure of the present invention may begin to be generally described. Referring to Figure 1 a predetermined portion of the parent film 10 is illustrated. The parent film 10, at predetermined locations, is structurally weakened, e.g., by the use of presently known laser scoring technology.

Referring to Figure 2, an elevational edge view of

the parent film 10 including the score lines 12 may be seen. The weakened area 12 may also be imperforate and hermetic. The weakened areas 12 define an integral tear off portion or fold structure 11.

Referring to Figure 3, the film 10 is folded over, as shown, to form the fold structure 11 and a zipper assembly 20 is inserted. Weakened areas 12 are preferably positioned below the zipper structure 20a so that when fold structure or hood 11 is removed the zipper structure 20a is exposed sufficiently above the resulting fin structures 19 to allow the user access to the zipper structure 20a. Zipper skirts 16 are shown bonded to the film 10. However, it is presently believed preferable, prior to insertion of the zipper assembly 20, that the uncut ends 23 (see Figure 5) of each zipper assembly 20 be punched out or cut to form a radiused notch 22a, as shown in Figure 7. The cut zipper assembly ends 22 are sealed together (the sealed mass 22b of Figure 7) which will later function to retain the contents of the bag 100 such as food.

Referring back to Figure 3, the skirt(s) 16 remain intact so that the zipper assembly 20 is kept continuous for ease of handling. Once inserted the skirt(s) 16 of the zipper assembly 20 is bonded to the inside surface 10a of the parent film 10 at seal location(s) 14.

Next sides 30 and 32 are sealed, along margin 10c illustrated in Figures 5 or 7, using a known mechanism such as a heat-sealing bar of a form fill and seal machine by advancing the folded film 10 to the heat sealing bar portion of the machine used; creating a seal 30a across the length and width of margin 10c. The resulting bag 100 is then filled with a predetermined foodstuff or other desired material through the opening 33 located, opposite the zipper assembly 20, at bottom edge 34 shown in Figure 5 or 7. Then bottom edge 34 is

subsequently sealed, forming seal 34a.

This results in the zipper assembly 20 being hermetically sealed within the tear off portion 11. Tear off portion 11 is integral to the parent film 10. Integral tear off portion 11 may be easily removed by tearing along the score lines 12, leaving the zipper structure 20a fully exposed and easily accessible for the use desired.

The above noted process and mechanism may also be performed so that the zipper assembly 20 is located along one of the long sides 30 or 32 of the bag 100 rather than the short side of the rectangle, which is defined by the bag 100.

Referring to Figure 5, a second embodiment of the present invention 1 is illustrated. As may be seen from Figure 5 two bags 100 are shown prior to their being separated along seam 101. This embodiment includes score lines 12 laid out in an alternative pattern that includes curve or arcuate section 13 and tear notch 24. As further disclosed in Figure 7 the parent film 10 is sealed at section 26 to either its opposing sides 35 and 36 or the structure of the zipper assembly 20. The tear notch 24 provides a starting point for removing the fold structure 11, which is located above the zipper assembly 20. The fold structure 11 being defined by the location of the score lines 12. The score lines 12 extending along curve 13 to a predetermined area below the zipper assembly 20 for substantially the entire width of the reclosable bag 100 facilitating removal of the hood or fold structure 11 and exposure of the zipper structure 20a. The embodiment of Figure 5 further including a hermetic seal 40.

Referring now to Figure 8, a cross-sectional view of the embodiment of Figure 7 may be seen. In particular, the integral skirt 16, usually comprised of

two strips on pieces of plastic film or a one-piece unit of continuous film, may be seen to have its outside surface 19 sealed hermetically to the inside surfaces 36a and 35a at respective hermetic seals 40a and 40. Additionally, a peelable seal 50 is located at the bottom of the skirt 16. Any standard commercially known resealable adhesive 51 may be used to make the peel seal 50. The peel seal 50 may also be a hermetic seal 40b.

Referring now to Figure 9 an alternative to the embodiment of Figure 8 is shown. In this embodiment the zipper skirt 16 is heat sealed to the side panels 36 and 35 respectively of the parent film 10. The inside surfaces 17 of the zipper skirt 16 are peelable sealed to one another, using a known releasable adhesive 51, to provide a releasable hermetic or gas tight seal 50 therebetween. It should be noted that the terms resealable adhesive or releasable adhesive as used herein should be construed interchangeably as well as given their common meaning.

Referring now to Figure 10 another alternative embodiment of Figure 8 is shown. In this embodiment the parent film 10 is sealed along a predetermined portion 42 of inside surface 35a and 36a. A known releasable adhesive 51 is used to form a peelable seal 50 between inside surfaces 35a and 36a at predetermined portion 42. US Patent No. 4,944,409 contains an example of such an adhesive. Presently, CUREX brand grade 4482-0, supplied by Curwood of Oshkosh, Wisconsin is considered an acceptable adhesive for use with this embodiment of the present invention.

Referring now to Figures 11 and 12 another alternative embodiment is illustrated wherein the peelable seal 50 is comprised of a peel seal tape 53 having a permanent sealant like a metallocene catalyzed polyethylene located on one side and a releasable seal

material like the aforesaid CUREX brand material on the other side (side 54).

One possible method for achieving the structure of Figure 11 and 12 is the use of a form fill and seal machine system in which the peel seal tape 53 would be tacked onto a predetermined location of the parent film 10 prior to the plow 200. (See Figures 31, 33, and 34 for a general illustration of the location of the plow 200 in relationship to the other components of a form fill and seal machine. Please note with reference to Figure 33 that it is presently believed preferable for heat sealer bar 208 to be enlarged sufficiently so that in addition to sealing the tear tape 120 is place it also seals the permanent seal side of the peal seal tape 53 in place at the same time. Accordingly, while one sealer bar 208 is believed preferable for these separate functions multiple bars could be used, each having a dedicated function or a combination of functions). After the plow 200 the peelable sealant side 54 would be sealed to the parent film 10 by heat sealer bars 55. Use of sealer bars 208 and 55 as disclosed herein allows independent temperatures and pressures to be used for each seal and it is believed that more consistent peel seals will result.

Additionally, the zipper skirt 16 may be sealed in place subsequent to the plow 200 by sealer bar 56 and the header seal 206a may be made by sealer bar 57 as illustrated generally in Figures 34 and 36.

Referring now to Figure 13 another alternative embodiment of Figure 10 is shown. In this embodiment, the zipper skirt 16 includes an elongated section 16a. End 21 of elongated section 16a is positioned between the inside surfaces 36a and 35a of the side panels 36 and 35 of the parent film 10. The elongated section 16a is heat sealed to the parent film 10 on inside surface 35a

and peelable sealed using a known releasable adhesive 51 to inside surface 36a to form peel seal 50.

Referring now to Figure 14 a third embodiment of the present invention is disclosed. Again, two bags 100 are shown prior to their being separated along seam 101. The invention of the third embodiment is comprised of parent film 10, which is used to form the bag 100 that is to be filled. The bag 100 includes a first side seal 30, a second side seal 32, and a fill opening 33. Side panel 35 forms the front side of the bag 100. The fill opening 33, after the bag 100 is formed and filled with a predetermined type of food material, is heat sealed to form bottom edge or seal 34. The bag 100 further includes a fold structure 11, header 15, integral zipper skirt 16, a zipper assembly 20 including a zipper structure 20a, at least one hermetic seal 40, an unsealed area 60, and a section 62 where the zipper skirt 16 and the ends 23 of the zipper assembly 20 are heat sealed together (see sealed mass 23b in Figure 14) prior to their insertion between the front side 35 and the back side 36 of the film 10. This forms sealed mass 23b. The formation of sealed mass 23b may take place at sealer 216, which is illustrated in Figure 30.

Sealing zipper skirt(s) 16 to the parent film 10 forms the hermetic or gas tight seal 40. The zipper skirts 16 may have a predetermined portion or portions that extend past seal 40 and which may be held together with a peel seal 50. See for example, Figure 15.

Since, within the unsealed area 60, the side panels 35 and 36 are not attached to the zipper assembly 20, the hood structure 11 (which may be defined by the score lines 12) may be easily removed to expose zipper structure 20a. The sealed mass 23b provides for containment of product when the peelable seal 50 is opened.

Referring to Figure 15 a view from line 15--15 of Figure 14 may be seen. This may be seen to be identical to the embodiment of Figure 8, except as explained above with reference to Figure 14.

Referring now to Figure 16 an alternative structure to the one shown in Figure 15 may be seen. In this alternative, the zipper skirt 16 is made of one piece of material. It is heat sealed to the inside surfaces 35a and 36a to form hermetic seals 40 and 40a. The skirt 16 is provided with a structural weakness 45 which extends linearly and generally parallel to hermetic seals 40 and 40a along the zipper skirt 16. The structural weakness 45 is designed to fracture or tear relatively easily when the customer opens the bag 100.

Referring now to Figure 17, an alternative to the embodiment shown in Figure 16 may be seen. In this embodiment the zipper skirt 16 includes a barrier film section 16b. The barrier film 16b is applied (preferably by heat sealing although other methods could be used, e.g., Adhesive coupling, ultrasonic or high frequency sealing technology) to the inside surface 16d of the zipper skirt 16. The zipper skirt 16 is heat sealed along a predetermined portion of its outside surface 16e to parent film 10 to form a hermetic seal 40. The barrier film section 16b is releasably sealed to the inside surface 16d to form at least one peel type seal 50. Note that it is presently believed that section 16b must have a surface 16c that is resistant to heat sealing.

Referring now to Figure 18 an alternative to the embodiment shown in Figure 17 may be seen. In this embodiment barrier film section 16b is heat sealed to a separate predetermined portion of the inside surfaces 35a and 36a of the parent film 10. To form two additional hermetic seals 40 located below the hermetic seals 40 of

the zipper skirt 16. The barrier film 16b is provided with a structural weakness at 45 which extends linearly and generally parallel to hermetic seals 40. The structural weakness is designed to fracture or tear relatively easily when the customer opens the bag 100.

Alternatively, the structure of Figure 17 could be provided with a structural weakness 45 as described with reference to Figure 18. In such a case peel seal 50 would be replaced with a permanent seal.

Referring to Figures 19 and 20, header strip 206, located between the front side 35 and back side 36 of the parent film material 10, of a predetermined size have sufficient width to extend down to, preferably just above, a tear line 132 (area of structural weakness). The header strip 206 terminates at edge(s) 131. This tear line 132 has the predetermined propensity to tear in predetermined way. The extension of the header strip material 206 extends down so that it is adjacent to the tear line 132. This facilitates tearing off the hood structure 11 from the bag 100 along the tear line 132. The optional tear notch 134 facilitates initiation of the tear, the tear line 132 (the oriented parent film 10 or film 10 with the propensity to tear) directs the tear, and the header material 206, which is bonded or sealed to the front side 35 and back side 36 of the parent film 10, controls the tear so that the zipper structure 20a is consistently clear of the parent film material 10 after the removal of the hood structure 11.

Alternatively, if the header material 206 is made of an oriented polypropylene having at least one side with a heat sealable sealant then the parent film 10 would not need to be oriented or have the tear line 132 or propensity to tear. Presently, it is believed preferable that if the header material 206 is made of an oriented polypropylene then the oriented polypropylene

should have both its sides coated with a heat sealable sealant. Also, alternatively, a plurality of header strips 206 could be used instead of a single integral header strip 206. In either case, the parent film 10 would not necessarily need to be oriented or have a tear line 132 or a propensity to tear.

Referring to Figures 21 and 22, at least one but preferably two pieces of tear tape 120, located between the front side 35 and back side 36 of the parent film material 10 on film surfaces 35a and 36a, of a predetermined size are bonded or sealed to the parent film 10 of the hood structure 11 adjacent, preferably just above, a tear line 132 (area of structural weakness). This tear line 132 has the predetermined propensity to tear in predetermined way. The tear tape material 120 adjacent the tear line 132 facilitates tearing off the hood structure 11 from the bag 100 along the tear line 132 in a controlled manner. The optional tear notch 134 facilitates initiation of the tear, the tear line 132 (the oriented parent film or film with the propensity to tear) directs the tear, and the tear tape 120, which is bonded or sealed to the front side 35 and back side 36 of the parent film 10, controls the tear so that the zipper structure 20a is consistently clear of the parent film material 10 after the removal of the hood structure 11. Alternatively, if the tear tape material 120 is made of an oriented polypropylene having at least one side with a heat sealable sealant then the parent film 10 would not necessarily need to be oriented or have the tear line 132 or propensity to tear.

With respect to facilitating removal of hood or fold 11 it should be understood that instead of score lines 12 the parent film 10 may be weakened in predetermined areas using other procedures as well, including but not limited to scoring or the use of multi-

ply laminate film having a predetermined weakened area or the addition of a tear assistance structure, e.g., Tear tape 120 or tear string 120a. The tear assistance structure may be added for use by itself or in conjunction with a predetermined area of structural weakness 12 to aid in the tearing of the film 10. See Figures 28 and 29.

Referring to Figure 23 another alternative to the embodiment disclosed in Figure 22 is disclosed. In this embodiment tear tape 120 is applied to both the inside surfaces 36a and 35a and the outside surfaces 36 and 35 of the bag 100. In this embodiment no score line or weakening 132 is believed necessary (although such an area of structural weakness could be used) since the tear tape 120 located on both the inside and outside surfaces of the bag 100 will act as an effective tear guide.

Referring to Figures 24, 25, and 26 another alternative to the embodiment shown in Figure 22 is illustrated. In this embodiment a modified tear tape 120b having a tear bead 120c is used.

As Figures 24-26 illustrate, when the film 10 is sealed to the tear tape 120b the bead 120c is depressed into the film 10 creating an area of structural weakness 12 without requiring pre-scoring or other modification of the parent film 10 prior to the application of the tear tape 120b. This structure is believed beneficial because the tear tape 120b is always in alignment with the area of structural weakness 12.

Referring to Figure 27 another alternative to the embodiment disclosed in Figure 22 is disclosed. In this embodiment tear tape 120 is applied to both the inside surfaces 36a and 35a and the outside surfaces 36 and 35 of the bag 100. The tear tape 120 is applied to border both sides of the score line or weakening 132. Since the tear tape 120 is located on both sides of the score line

132 and on the inside and outside surfaces of the bag 100 a very consistent controlled or guided will be achieved.

Tear tape 120 is interchangeable with tear string 120a. Accordingly, a tear string 120a could be substituted for the tear tape 120. See, e.g., Figures 38 and 39. Preferably, the tear tape 120 or the tear string 120a used is made from a material, e.g., Thermoplastic material, that is compatible with the film 10 and which may be sealed, coupled, or bonded to the film 10. For example, the tear tape 120 or tear string 120a may be formed of polyethylene or may be encased in polyethylene. It is understood in the art that a tear string, such as tear string 120a, may have various cross-sectional shapes, e.g., Round, square, triangular, etc., which may be used to enhance its ability to tear the parent film material 10.

In particular, referring to Figures 30, 32, and 35, the process by which the alternative embodiment having tear tape 120 is presently believed to be manufacturable is illustrated using an rpm 100 machine. The parent film 10 is fed over a predetermined number of rollers and toward the plow structure 200. The parent film 10 after passing over dancer roller 203a is die punched by die 210 to present parallel openings 121. It is presently believed that the film 10 must pass over the dancer rollers 203a so that they are kept sufficiently taut thus allowing openings 121 to be punched out accurately at predetermined positions, by die 210, such that the positions of the openings 121 are always at the same or a uniform distance from each other. In addition to the parent film 10 two rolls of tear tape 120 are fed over the parent film 10 and in parallel alignment with the parallel openings 121 such that the tear tape 120 preferably, but not necessarily, bisects each the parallel opening 121. Tear string 120a could be

substituted for tear tape 120. See, e.g., Figures 38 and 39.

In addition, referring back to Figures 30, 32, and 35, optionally a header material 206 may be fed over the parent film 10. Further, the zipper or slider assembly 20 is also fed over the parent film 10. Prior to being fed over the parent film 10 the zipper assembly 20 has a notch 22a die punched, by die 214 and heat sealed by sealer 216, at a predetermined position that is also designed to be in general alignment with the parallel openings 121. Once the tear tape 120 is presented over the parent film 10 but before it is passed over the plow 200 it passes over a tear tape sealer mechanism 208 so that the tear tape 120 is sealed to the parent film 10. Alternatively, the tear tape 120 could be tacked in place and subsequently sealed to the parent film 10 either before or after the plow 200.

The parallel openings 121 may be of any shape although circular is the shape that is presently preferred. Diamond shaped cuts could be used to further enhance initiation of the tear in the parent film 10. See Figure 37.

Additionally, the notch 22a as generally illustrated herein may be of an arcuate or radiused shape but the notch 22a could also be made at a sharp angle such as a 90° angle. See Figure 37. The sharper angle is presently believed to add more stress to the structure of the zipper assembly 20 and therefore a radiused structure is presently considered to be preferred. However, the present invention should not be interpreted as being limited to solely a radiused notch 22a as generally illustrated herein.

After the parent film 10 is folded the remaining manufacturing process is carried out as generally illustrated in Figure 35. The zipper skirts 16 are

sealed to the respective sides of the parent film 10 at seal 14. The header strip 206, if used, is sealed to the parent film 10 at seal 206a. The side seal 30a is made, which also seals the perimeter or edge 121a of opening 121. (note, if no tear tape 120 or tear string 120a is used then it is presently considered best to add a tear notch 24 to the opening 121 to facilitate removal of the hood 11.) An opening 123 is die punched in the package 100 to provide a point where the package 100 may be easily hung for display purposes. The package 100 is then cut along seam 101 from the V-fold portion of the form fill and seal machine and transferred to the fill and seal stations where fill opening 33 is opened and the package 100 is filled and gas is flushed through the fill opening 33. Opening 33 is then hermetically sealed at seal 34a.

Alternatively, referring to Figure 38 and Figure 39 the zipper assembly 20 may be introduced subsequent to the plow structure 200. The parent film 10, prior to being fed over the rollers 202 is still die punched by die 210 to present parallel openings 121. Also, alternatively, the tear tape 120 or tear string 120a may be feed over the parent film 10 and in parallel alignment with the parallel openings 121 subsequent to the plow 200. See Figures 38 and 39. Again, the tear tape 120 or tear string 120a preferably, but not necessarily, bisects each parallel opening 121. Also, while Figure 39 shows both the tear string 120a and skirts 16 of the zipper assembly 20 being introduced to the parent film 10 subsequent to the plow 200 and respectively sealed by sealer bars 208 and 209 it should be understood that either the tear string 120a or the zipper assembly 20 could be introduced before the plow 200. For example, the zipper assembly 20 could be introduced after the plow 200 and the tear string 120a prior to the plow 200.

Since tear tape 120 is interchangeable with the tear string 120a it will be apparent to a person of ordinary skill in the art reading this disclosure that the tear tape 120 could also be introduced after the plow 200 and used in essentially the same manner as the tear string 120a.

The openings 121 are provided, at a minimum, to facilitate access to the tear tape 120 or the tear string 120a and to facilitate tearing and removal of the hood 11 to expose the zipper assembly 20.

Additionally, the present invention may be used in combination with other VFFS and HFFS machines. The present invention could also be used with HFW machines. However, in using either VFFS machines or HFFS machines the method of the present invention is presently believed to require post-compression (commonly called post-squashing) of a predetermined portion of the track structures 20b, with respect to the embodiment shown in Figure 6. (sometimes also referred to as track mass 20b, herein) of the slider closure assembly 20 located within a margin or line 10b of the parent film 10 where a seal 30a, especially a hermetic seal, is desired. Alternatively, the track mass 20b may have a pre-compressed portion located with margin 10b. Neither pre-compression nor post-compression are believed to be required where a notch, e.g., 22a of Figure 7, has been punched out or cut from the zipper assembly 20. However, if pre-compression is desired then this is accomplished in the present invention at sealer 216 shown in Figure 30. This is so that when, on either a HFFS or VFFS machine, the track mass 20b (with the slider or zipper structure 20a avoided) passes through the package side seal zone portion of either the machine a consistent hermetic seal 30a is produced by the application of the heater bars of the machine used. As will be apparent to

a person of ordinary skill in the art from this disclosure, if a notch, e.g., notch 22a of Figure 7, is cut from the zipper assembly 20 then there is no structure or mass for sealer 216 to pre-compress and sealer 216 will then only provide seal 22b of the cut end 22, as shown in Figure 7.

In applications using HFW machines for the manufacture of the embodiment shown in Figure 5, such as Jones Automation Company machines, it is not believed necessary to pre-compress, post-compress, or squash a predetermined portion of the track mass 20b. HFW machines have a rotary jaw assembly, which includes a hinged side. The jaw assembly provides at least two advantages, either of which, separately or in combination, eliminates the need for pre-compression of the track mass 20b. First, the jaw assembly provides a relatively long time, longer than the time provided by either VFFS or HFFS machines, for the application of heat and pressure sufficient to form the desired seal 30a. Second, the portion of the track mass 20b that is targeted to be fused or sealed (generally located within the boundary of margin 10b) is placed or fed into the jaw assembly so that it is placed toward and near the hinged portion of the jaw assembly and thus maximum mechanical advantage and force may be applied to the predetermined portion of the track mass 20b.

If either the longer seal time or the mechanical advantage of the jaw assembly of the HFW machine was not available then, referring to Figure 6, since there is generally insufficient room on an HFW machine to pre-compress the track mass 20b, the track mass 20b may be pre-punched with a die at the predetermined location 22a (where the seal 30a is also to be applied or created) prior to insertion into the fold 11 of the parent film 10. Since the pre-punched area or notch 22a would be

synchronized to be in registration with the portion of the folded parent film 10 that is to be sealed, less energy (time, temperature, and/or pressure), due to the reduced mass to be sealed is required to consistently obtain the type of seal 30a desired. (note, pre-punching rather than pre-compression could also be used with HFFS or VFFS machines.)

Referring now to Figures 40, 40a, 41 and 41a, an alternate embodiment of the present invention may be seen. The film 10 is folded over, as shown, to form the fold structure 11, and a zipper assembly 20 is positioned over the fold structure 11. Weakened areas 12 are preferably positioned below the zipper structure 20a, so that when the zipper structure 20a is in the open position the fold structure 11 and its weakened areas 12 are exposed to allow the user access to the fold structure 11. Seen particularly in Figure 41, the overlaying zipper skirt 16, of the alternate embodiment may be viewed. Zipper skirt 16 is usually comprised of two strips of pieces of plastic film or a one-piece unit of continuous film, and is seen to have its inside surfaces 17 sealed hermetically to the outside surfaces 35b, 36b of the film 10 at respective hermetic seals 40c, 40d. The fold structure 11 is preferably designed to act as an imperforate hermetic barrier to protect the contents of bag 100. Tearing the fold structure 11 allows the user access to the contents and also provides visual evidence that the hermetic seal is broken. Seen particularly in Figures 40a and 41, the inside surfaces 35a, 36a of the parent film 10 may also be peelably sealed to one another, using a known releasable adhesive 51, to provide a releasable hermetic or gas tight seal 50 therebetween. The seal 50 is located adjacent, perferably just below, the weakened areas 12.

As best seen in Figures 40 and 40a, two bags 100 are

shown prior to their being separated along seam 101. The alternate embodiment seen in these views is comprised of parent film 10, which is used to form the bag 100 to be filled. The bag 100 further includes a header 15, and a peg hole 15a, seen in this embodiment at the end opposite the fold 11. It is presently believed preferable, after the folding and sealing of parent film 10 that the parent film 10 be punched out to form a tear area 24a. The parent film is then sealed around the perimeter of the punched out tear area 24a and a tear notch 24 is added, as seen in Figure 40. These steps are preferably performed before the attachment of the zipper assembly 20 and zipper skirt(s) 16. Following this, the zipper assembly 20 is positioned and bonded to the outside surfaces 35b, 36b, of the parent film 10, and over the fold 11. Alternately, the parent film 10 may be sealed around the perimeter to include the sealed perimeter of the punched out tear area 24a so that after the punching step which forms tear area 24a, the sealed perimeter remains. The tear notch 24 provides a starting point for removing the fold structure 11, which is surrounded by the zipper assembly 20 and attached zipper skirt 16. Further, at least one piece of tear tape 120, located between the front side 35 and back side 36 of the parent film 10 on film surfaces 35a, 36a, of a predetermined size may be bonded or sealed to the parent film 10 at the fold 11. The tear tape 120 is located adjacent, preferably just above, a tear line 132 (area of structural weakness). This tear line 132 has the predetermined propensity to tear in a predetermined way. The tear tape material 120 adjacent the tear line 132 facilitates tearing off the fold structure 11 from the bag 100. The aforementioned tear notch 24 facilitated initiation of the tear.

Referring to Figures 41 and 41a, the skirt(s) 16

remain intact so that the zipper assembly 20 is kept continuous for ease of handling. Once positioned over the punched fold structure 11, the skirt(s) 16 of the zipper assembly 20 is bonded to the outside surfaces 35b,36b of the parent film 10 at seal location(s) 40c, 40d. Next, sides 30 and 32 are sealed, along margin 10c illustrated in Figure 40, using a known mechanism such as a heatsealing bar of a form fill and seal machine (as described earlier in the present application) by advancing the film 10 to the heat sealing bar portion of the machine to be used.

It will be apparent to the person of ordinary skill in the art after reading this disclosure that the present alternative embodiment shown in Figures 40, 40a, and 41, 41a may be manufactured using the methodology previously disclosed herein with the necessary modifications, which this specification makes apparent to a person of skill in the art.

With reference to Figures 42 - 45a, an alternative embodiment reclosable bag 100' including a gusseted portion 310 and side fill opening 300 is shown.

The gusseted, reclosable bag 100' includes at least one sheet of web material 10 having at least two areas of structural weakness 12. The areas of structural weakness 12 may be micro perforations, scoring or any other structural weakness that will allow facile tearing of the web material 10. The weakened areas 12 define an integral tear off portion or fold structure 11. The gusseted, reclosable bag 100' is further defined by a gusseted portion 310 and a sealable fill opening 300. The sealable fill opening 300 is located generally between the fold structure 11 and gusseted portion 310. A backing or barrier strip 320 is inserted between the zipper skirts 16. The backing or barrier strip 320 is preferably two-ply material and may be composed of

laminent film such as Curwood's 7182 barrier film. A first or inner side 328, may be composed of Nylon, polypropylene, or any other suitable material that will not bond to the parent film 10 during sealing. A second or outer side 329 of the strip 320 may be provided with a sealant, such as a polyethylene, polyethylene blend, or a polyethylene co-extrusion. The backing or barrier strip 320 is preferably notched at 326 and 326a (best seen in Figure 47) to allow proper sealing of side seal 30a. A zipper assembly 20 having attached zipper skirts 16 is inserted in the fold structure 11. When the zipper assembly 20 and skirt(s) 16 are bonded to the inside surface 36a of parent film 10 at 14, the inner resistant side 328 of strip 320 prevents the skirt(s) 16 from sealing together along their respective inner surface 17, seen particularly in Figure 45. The skirts 16 are bonded at 14 to the inside surface of the parent film 10.

As may be seen from Figure 42, two bags 100' are shown prior to their being separated along seam 101. This embodiment includes score lines 12 laid out in a pattern that includes a tear notch 24. The tear notch 24 provides a starting point for removing the fold structure 11, which is located above the zipper assembly 20. The parent film 10 is sealed at section 26 to either its opposing sides 35 and 36 or the structure of the zipper assembly 20. For ease of illustration, it is to be noted that seal 30a extends across notches 326, 326a in strip 320 and area 26a refers to the general area of the hermetic side seal 30a adjacent the notches 326, 326a. The fold structure being defined by the location of the score lines 12. The score lines 12 extend below the zipper assembly 20 for substantially the entire width of the reclosable gusseted bag 100', facilitating removal of the fold structure 11 and exposure of the zipper structure 20a. The embodiment of Figure 42 further

includes a sealable fill opening 300 located below the zipper assembly and above the bottom gusset 310.

Referring now to Figures 43 and 44, a cross-sectional view of the embodiment of Figure 42 may be seen. In particular, the backing or barrier strip 320 is seen with an upper portion 324 thereof attached to the inside surface 17 of the zipper skirt 16. As may be further seen, a lower portion 322 of the barrier strip 320 is attached to the inside surface 32a of the bag 100' at a point just below the fill opening 300. As illustrated particularly in Figure 44, the lower portion 322 is seen prior to attachment to inside surface 32a, with the fill opening 300 in the open position. For illustration purposes, when opening 300 is shown in the closed position the web edges 400 are seen as not completely abutting. It is to be understood that while it is preferred that the edges 400 abut, it is within the scope of the present invention to include a closed opening 300 wherein the web edges 400 are not completely abutted.

Referring to Figure 45, the film 10 is folded over, as shown to form the fold structure 11 and a zipper assembly 20 is inserted. Weakened areas 12 are preferably positioned below the zipper structure 20a so that when the fold structure 11 is removed, the zipper structure 20a is exposed sufficiently above the resulting fin structures 19 to allow the user access to the zipper structure 20a. Zipper skirts 16 are shown bonded to the film 10. However, it is presently believed preferable, prior to insertion of the zipper assembly 20, that the uncut ends (not seen in these views) of each zipper assembly 20 be punched out or cut to form a radiused notch 22a, as shown in Figure 42. As seen in Figure 45, an upper portion 324 of a backing or barrier strip 320 is attached to the inside surface 17 of one of the zipper

skirts 16. A lower portion 322 of the strip 320 extends beyond the distal margin 342 of the zipper skirt 16 and is bonded to the inside surface 36a of side 36. It is presently believed preferable, prior to attachment to the zipper skirt 16, that the backing or barrier strip 320 be punched out or cut to form notch 326 (seen in Figure 47). As may be further seen in Figure 47, barrier strip 320 is further punched prior to insertion into fold structure 11, to form notch 326a, also in register with side seal 30a. Notches 326 and 326a are positioned to be in register with radiused notch 22a of zipper assembly 20, all of which are positioned to be in register with side seal 30a, seen in Figures 42 and 48. Consecutive notches 326, 326a in barrier strip 320 alleviate the presence of barrier strip 320 at side seal 30a, thus facilitating a hermetic seal at area 26a (best seen in Figure 42). The hermetic seal is obtained by sealing inside opposing surfaces 35a, 36a at 26a and 30a. The inside surface 10a of parent film 10 is simultaneously sealed to the zipper skirts 16 at area 14, as seen in Figure 45, and simultaneously, inside surfaces 17 of skirts 16 (Figure 45) are sealed to each other in the notched out areas 326 and 326a at 26a, where the barrier strip is not present (seen best in Figure 42).

As illustrated in Figures 45 and 47, the skirt(s) 16 remain intact so that the zipper assembly 20 is kept continuous for ease of handling. Once inserted, the skirt(s) of the zipper assembly 20 is bonded to the inside surface 10a of the parent film 10 at seal location(s) 14.

Referring to Figures 46, 47, and 48, the process by which the alternative embodiment gusseted, side fill bag 100' (seen in Figures 42 - 45) is presently believed to be manufacturable is illustrated using an rpm 100 machine. The parent film 10 is fed over a predetermined

number of rollers and toward the trapezoidal plow structure 200a. In addition to the parent film 10, the zipper assembly 20 and backing strip 320 are fed over the parent film 10. It is presently believed that the zipper assembly 20 and backing strip 320 must pass over the dancer rollers 203a so that they are kept sufficiently taut thus allowing notches 22a, 326, and 326a to be punched out accurately at predetermined positions such that the notches 22a and 326 will be in register with each other when the backing strip 320 is inserted between zipper skirts 16. Prior to being fed over the parent film 10, the zipper assembly 20 has a notch 22a die punched, by die 214' and heat sealed by sealer 216', at a predetermined position at seal 22b that is also designed to be in general alignment with the notch 326 in strip 320, formed by die 214'' and 326a formed by die 214'. It is to be noted that notch 326 is preferably formed such that the distal margin 342 of skirt 16 extends into the notch 326. This configuration allows notch 326a to be formed by die 214' with minimal chance of skirt 16 being inadvertently notched by die 214'. Die 214' simultaneously forms notches 326a and 22a. The parent film 10 is folded over the zipper assembly 20 to form the fold structure 11. Before the parent film 10 is passed over the trapezoidal plow 200a it passes over a zipper sealer mechanism 216 whereby the zipper skirts 16 are sealed to the parent film 10 at the inside surfaces 35a, 36a of opposing sides 35, 36 respectively. Unlike prior embodiments, no blade between the skirts 16 is needed during sealing since, as seen in Figure 45, the inner side 328 of strip 320 will not seal to the inside surface 17 of opposite zipper skirt 16. Further, gusset holes 344 are die punched by die 344a at a predetermined position designed to be in general alignment with side seal 30a. The gusset holes 344 allow gusset folds to be

attached to each other at side seal 30a thereby adding rigidity to the gusset portion 310 of the gusseted bag 100'. This added rigidity enables the gusseted bag 100' to stand up by itself when placed on a flat surface such as a table or refrigerator shelf (not seen in these views). Further, with reference to the prior art gusseted bags 460 seen in Figure 57, additional seals 470 may be included for additional rigidity and containment as would be desired with liquid products.

In addition, referring to Figures 46 and 47, optionally a header material 206 may be fed over the parent film 10. The header strip 206, if used, is sealed to the parent film 10 at seal 206a, seen particularly in Figure 47. As seen in Figure 46, seal 206a is formed by heat sealer 216. Heat sealer 216 simultaneously seals the zipper skirt(a) 16 to the parent film 10 at 14. The parent film 10, attached zipper assembly20, and strip 320 are passed over roller 350. After the parent film 10 is folded and the zipper assembly 20 is inserted, the remaining manufacturing process is carried out as generally illustrated in Figure 48. The parent film 10 and attached zipper assembly 20 passes over a trapezoidal folding board or plow 200a. The folding step leaves a flat bottom prior to the parent film 10 being passed over a tucking board 334. The tucking board 334 reverse folds the previously formed flat bottom of the parent film 10 into a gusset 310. The side seal 30a is made. It is to be noted that the barrier strip 320 preferably marginally enters the area of side seal 30a at seal area 26a. Notches 326 and 326a preferably remove a majority of the barrier strip 320 in the seal 30a area to provide hermetic seal 30a. Although it is preferred that the barrier strip 320 minimally enter the side seal 30a area at seal area 26a, it is within the province of the present invention to provide a barrier strip 320 which

ends before, at, or beyond the side seal 30a area. Further, it is to be understood that the present invention may be practiced using a barrier strip 320 having longitudinally-spaced sealable areas whereby the notches 326 and 326a are not necessary and the sealable areas are arranged to be in alignment with the seal area 30a. Tear notch 24 is added to facilitate removal of the fold 11. An opening 123 is die punched in the package 100' to provide a point where the package 100' may be easily hung for display purposes. The package 100' is then cut along seam 101 from the bag making portion of the form fill and seal machine and transferred to the fill and seal stations where the side fill opening 300 is opened and the package 100' is filled through side fill opening 300. The opening 300, seen in Figure 48, is then hermetically sealed at seal 340, as seen in Figure 48. The presence of the backing or barrier strip 320 permits the seal 340 to be formed while the inside surfaces 17 of zipper skirts 16 are not sealed to one another (see Figure 45). As previously described with reference to Figures 42-45, the inner side 328 of strip 320 will not seal to inside surface 35a or zipper skirt 16 during sealing, thus permitting a seal without the need for a blade between the skirts 16.

Referring now to Figures 49 - 52, an alternative embodiment gusseted, side fill bag 100' is illustrated. As may be seen, a press-to-close zipper assembly 20' having lower skirt(s) 16 and upper skirts 16a may be inserted in the fold structure 11. As in the embodiment shown in Figures 42-45a, the gusseted, reclosable bag 100' with press-to-close zipper assembly 20' seen in Figures 49-52 includes at least one sheet of web material 10 having at least two areas of structural weakness 12. The weakened areas 12 define an integral tear off portion or fold structure 11. The gusseted, reclosable

bag 100' is further defined by a gusseted portion 310 and a sealable fill opening 300 which is located between the fold structure 11 and gusseted portion 310. As best seen in Figure 52, the press-to-close zipper assembly 20' typically includes a male track structure 330 and a female track structure 331. The male track structure 330 and the female track structure 331 each include an upper zipper skirt 16a of web material extending therefrom and a lower zipper skirt 16 extending therefrom. Each zipper skirt 16, 16a includes a predetermined coupling area arranged to be sealed to the parent film 10 at sealing location 14.

As may be further seen in Figure 52, the zipper skirt(s) 16 is heat sealed to the inside surface 35a, 35b of side panels, 35 and 36 respectively, of the parent film 10. A backing or barrier strip 320 is located between, and extends below the zipper skirts 16. As discussed with reference to the embodiment shown in Figures 42 - 45, the backing or barrier strip 320 is preferably two-ply and composed of a laminate film such as Curwood's 7182 barrier film. As such, the strip includes a first side 328 and a second side 329. The first side 328 is preferably composed of Nylon, polypropylene, or any other substance known in the art that will not bond to the zipper skirt 16 or parent film 10 during heat sealing. The second side 329 may be provided with a sealant, such as a polyethylene, polyethylene blend, or a polyethylene co-extrusion. The second or sealant side 329 of the strip 320 is sealed or tacked to the inside surface 17 of a zipper skirt 16 prior to insertion in the fold structure 11 at a location adjacent the sealable side fill opening 300 at seal 335. The inner, resistant side 328 of strip 320 prevents the skirt(s) 16 from sealing together along their respective inner surface 17 during sealing of the side fill opening

300. The backing or barrier strip 320 is preferably notched at 326 and 326a, as seen in Figure 54, to allow proper sealing of side seal 30a.

As may be seen from Figure 49, two bags 100' having press-to-close zipper assembly 20' are shown prior to their being separated along seam 101. The score lines 12 are seen to be laid out in a portion that includes a tear notch 24. The tear notch 24 provides a starting point for removing the fold structure 11, which is located above the press-to-close zipper assembly 20'. The fold structure 11 being defined by the location of the score lines 12. The parent film 10 is sealed at area 26a to either its opposing sides 35 and 36 or the structure of the press-to-close zipper assembly 20'. For ease of illustration, it is noted that the seal 30a extends down across notches 326, 326a in strip 320. Reference numeral 26a refers to this general area of hermetic side seal 30a. The embodiment seen in Figure 49 further includes a sealable fill opening 300 located below the fold structure 11 and above the bottom gusset 310.

Referring now to Figures 50 and 51, a cross sectional view of the embodiment of Figure 49 may be seen. The backing or barrier strip 320 is particularly seen, with the upper portion 324 thereof attached to the inside surface 17 of zipper skirt 16. The lower portion 322 of the barrier strip 320 is attached to the inside surface 36a of the parent film 10 at a point below the fill opening 300. As illustrated particularly in Figure 51, the lower portion 322 is seen prior to attachment to inside surface 36a, with the fill opening 300 in the open position. For illustration purposes, when opening 300 is shown in the closed position, as in Figure 52, for example, web edges 400 are seen as not completely abutting. It is to be understood that while it is preferred that web edges 400 completely abut when opening

300 is in the closed and sealed position, it is within the scope of the present invention to include a closed opening 300 having non-abutting web edges 400.

Referring now to Figures 53- 55a, the process by which the alternative embodiment, gusseted, side fill bag 100' (seen in Figures 49-52) is illustrated. Seen particularly in Figure 54, a press-to-close zipper assembly 20' may be introduced prior to the trapezoidal plow structure 200a. The parent film 10 is fed over a predetermined number of rollers and toward the plow 200a. The press-to-close zipper assembly 20' and backing strip 320 are fed over the parent film 10. It is presently believed that the press-to-close zipper assembly 20' and backing strip 320 must pass over the dancer rollers 203a so that they are kept sufficiently taut to allow notches 326, and 326a to be punched out accurately at predetermined positions such that the notches 326 and 326a will be in register with each other when the backing strip 320 is inserted between zipper skirts 16. As seen in Figure 54, notch 326 is punched out prior to insertion of the strip 320 between skirt(s) 16, whereas notch 326a is punched out prior to insertion of press-to-close zipper assembly 20' into fold structure 11. It may be further seen that notch 326 is preferably formed such that the distal margin 342 of skirt 16 extends into the notch 326. This configuration allows notch 326a to be formed by die 214' while preventing skirt 16 from inadvertent notching by die 214'. Die 214" punches notch 326. Figure 55a illustrates the position of notches 326, 326a relative the backing strip 320 and distal margin 342 of zipper skirts 16. The press-to-close zipper assembly 20' is heat sealed by sealer 216 to strip 320 at seal 335.

The parent film 10 is folded over the press-to-close zipper assembly 20' to form the fold structure 11.

As seen in Figure 53, prior to being passed over the trapezoidal plow 200a, the parent film 10 it passes over a zipper sealer mechanism 216 whereby the zipper skirts 16 are sealed to the parent film 10 at the inside surfaces 35a, 35b of opposing sides 35, 36 respectively. As is further seen in Figure 53, the press-to-close zipper assembly 20' and backing strip 320 further passes over a blade 450 which allows the skirts 16 and 16a to be heat sealed to the web 10 while preventing the inner surfaces 17 of the skirts 16, 16a from sealing together. Further, gusset holes 344 are die punched by die 344a at a predetermined position designed to be in general alignment with side seal 30a. The gusset holes 344 allow gusset folds to be attached to each other at side seal 30a thereby adding rigidity to the gusset portion 310 of the gusseted bag 100'. This added rigidity enables the gusseted bag 100' to stand up by itself when placed on a flat surface, such as a table or refrigerator shelf (not seen in these views).

Again referring to Figures 53 and 54, optionally a header material 206 may be fed over the parent film 10. The header strip 206, if used, is sealed to the parent film 10 at seal 206a, seen particularly in Figure 54. After the parent film 10 is folded and the press-to-close zipper assembly 20' and strip 320 are inserted, the remaining manufacturing process is carried out as generally illustrated in Figure 55. The parent film 10 with attached press-to-close zipper assembly 20' and strip 320 passes over a trapezoidal folding board or plow 200a. The folding step leaves a flat bottom prior to the parent film 10 being passed over a tucking board 334. As is also illustrated in the manufacturing steps of the gusseted bag 100' seen in Figures 42-45, the tucking board 334 reverse folds the previously formed flat bottom of the parent film 10 into a gusset 310. The side seal

30a is made and tear notch 24 is added to facilitate removal of the fold structure 11. It may be seen that the barrier strip 320 preferably marginally enters the area of side seal 30a at seal area 26a. A majority of the strip 320 is removed by notches 326 and 326a, thereby allowing a hermetic seal to be formed at 30a. Although it is preferred that the barrier strip 320 minimally enter the side seal 30a area, it is to be understood that the barrier strip may end before, at, or beyond the side seal 30a at area 26a. An opening 123 is die punched in the package 100' to provide a point where the package 100' may be easily hung for display purposes. As seen in Figure 55, the package 100' is then cut along seam 101 from the bag making portion of the form fill and seal machine and transferred to the fill and seal stations where the side fill opening 300 is opened and the package 100' is filled through side fill opening 300. The opening 300 is then hermetically sealed at seal 340. The seal 340 is formed without use of a blade between the skirts 16, due to the presence of strip 320 between the skirts 16 which prevents the inside surfaces 17 of skirts 16 from sealing together while the opening 300 is sealed.

It is to be understood that the gusseted, side fill bags 100 and 100' having a backing or barrier strip 320 may alternatively include any of the features disclosed with reference to the embodiments shown in Figures 1 -42. Furthermore, although not shown in the Figures, it is within the scope of the present invention to provide a brush applied, anti-seal agent to the inside surface 17 of zipper skirts 16. A brush applied, anti-seal agent such as nitrocellulose obtained from Amantceh may thereby take the place of the barrier or backing strip 320 and provide a non-bonding function to the inside surface 17 of the zipper skirts 16 during seal of the fill opening 300.

The foregoing is considered as illustrative only of the principles of the invention. Furthermore, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described.